

## **IN THE SPECIFICATION:**

In the published version of this application which is US 2008/0231003, please correct the following paragraphs to read:

— — **[0003]** As a conventional dust cover for a steering shaft, there is one disclosed in ~~a Patent Document 1~~ Japanese Patent Publication No. 2001-324018. The dust cover 100 for a steering shaft that has a shaft sealing portion 101 that passes the steering shaft therethrough and is in contact with the steering shaft, and two bellows portions 102 and 102 having an inner peripheral end coupled to the shaft sealing portion 101 and an outer peripheral end attached to a panel fixing member 103. The shaft sealing portion 101 and the two bellows portions 102 and 102 are formed of rubber material and are integrally formed by using metal mold. In this technique, sound insulating properties are enhanced by providing these two bellows portions 102 and 102. Also the two bellows portions 102 and 102 and the shaft sealing portion 101 passing the steering shaft therethrough, are integrally formed, so that an operation of incorporating to a vehicle body is facilitated. — —

— — **[0004]** ~~Patent Document 1~~: Japanese Patent Publication No. 2001-324018 is cited as a material reference here. — —

— — **[0005]** In the technique of the ~~Patent Document 1~~ Japanese Patent Publication No. 2001-324018, however, there is a problem that since the shaft sealing portion 101, along which the steering shaft rotationally slides, is constructed of the same rubber

material as the bellows portion 102, a large frictional resistance occurs between the steering shaft and the shaft sealing portion 101, and that offensive sound is emitted during rotation of the steering shaft by the operation of the steering wheel since the steering shaft and the shaft sealing portion 101 rub against each other. --

-- **[0061]** The structure of the present invention will now be explained in detail based on a best mode illustrated in the drawings where the same reference numerals are used to designate the same or functionally similar parts throughout the drawings. --

-- **[0063]** The main body 30 of dust seal has a plurality of bellows in an ~~which~~ ~~stands up from the panel 19.~~

~~[0064]~~ The main body 30 of dust seal has a plurality of bellows in an axial direction of the steering shaft 20, for example, a first bellows 3a close to the vehicle compartment 17 side, and a second bellows 3b close to the engine room 18 side. In this case, for rubber material constituting the main body 30 of dust seal, material having high flexibility to favorably follow up an oblique movement of the steering shaft 20 is preferably used, and, for example, ethylene-propylene rubber is used in the present embodiment. Also, for the seal lip 4, in the present embodiment, for example, there is used NBR (acrylonitrile-butadiene rubber) having excellent physical properties for sealing sliding portions. However, the above-described material is a suitable exemplification, and other materials may be used. In this respect, in the present embodiment, the description is mainly made of a case where two bellows: first and second 3a and 3b are provided, and

if necessary, there may be provided three or more bellows. --

-- **[0067]** Here, when the steering shaft 20 inclines with respect to a direction indicated by an arrow A of FIG. 3, the first bellows 3a, which is farther from a center of rotation of the oblique movement, has a larger amount of deformation than the second bellows 3b, which is close to the center of rotation thereof. Thus, in the present embodiment, the curvature of the apex portion 10a of the first bellows 3a located closest to the vehicle compartment 17 side is made larger than the curvature of the apex portion 10b of the second bellows 3b. In other words, a curvature radius of the apex portion 10a is made smaller than that of the apex portion 10 b. With the features as described above, length of the inclined portion 9a in the first bellows 3a can be made longer than the inclined portion ~~portion~~ 9a of the second bellows 3b without changing an angle of the inclined ~~portion~~ portions 9a, 9b of both bellows 3a, 3b, and since the apex portion 10a of the first bellows 3a becomes easier to flex, the first bellows 3a can be made easier to become deformed larger in a radial direction of the steering shaft 20 than the second bellows 3b. Thereby, the follow-up properties of the main body 30 of dust seal to inclination or deviation or the like of the steering shaft 20 can be improved. --

-- **[0078]** The dust cover 1 for a steering shaft according to the present embodiment is assembled, for example, by the following method using: the bush 2 made integral with the seal lip 4; the main body 30 of dust seal comprising the first and second bellows 3a and 3b integrated with each other; and the fixing member 5. First, the fixed

portion 32b of the second bellows 3b is inserted into the fitted-in portion 22 of the bush 2 for fitting in until the stepped portion 15 bumps against the flange 14, and next, the fixed portion 32a of the first bellows 3a is fitted into the fitted-in portion 22 of the bush 2 and the fixed portion 32b of the second bellows 3b. At this time, one portion of the inclined portion 9a of the first bellows 3a, that is, the inclined portion 9a in the vicinity of the fixed portion 32a comes into contact with one portion of the second bellows 3b, that is, an inclined surface portion [[c]] C of the fixed portion 32b. Next, the fixing member 5 is fitted into the bush 2; the fitted-in portion 22 of the bush 2 is caused to penetrate the opening 5a in the circular plate portion 5b; the tube portion 5c is pressed in to cover the fixed portion 32a, 32b of the first, second bellows 3a, 3b therewith; and the fixed portion 32a, 32b of the first, second bellows 3a, 3b is caused to tighten the bush 2 with the tube portion 5c. In this state, the end portion of the fitted-in portion 22 of the bush 2 projected out of the opening 5a of the fixing member 5 is plastically deformed by heating in the case of the bush made of synthetic resin, or is caulked in the case of the bush made of light metal, and the fixing member 5 is fixed to the bush 2. Thus, the dust cover 1 for a steering shaft is assembled.

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— — **[0073]** On the outer peripheral surface of the bush 2, there are formed a fitted-in portion 22 in which each fixed portion 32a, 32b of the first, second bellows [[3]] 3a, 3b is fitted, and a stepped portion 14 for preventing the main body 30 of dust seal from coming off. In the case of the present embodiment, the stepped portion 14 is formed by a flange formed on one end portion of the bush 2, for example, the end portion on the engine room 18 side. Also, on an end portion at a side opposite to the end portion on which the

flange 14 of the bush 2 is formed, that is, on an end portion on the vehicle compartment 17 side, there is fixed an installation portion 5. In the outer peripheral surface of the fitted-in portion 22, a plurality of annular convex portions 13 are formed, and on the inner periphery of each fixed portion 32a, 32b of the first, second bellows 3a, 3b, there are formed annular grooves in which the convex portions 13 fit. The convex portions 13 are fitted in the grooves of the fixed portion 32a, 32b, whereby the sealing properties between the bush 2 and the first, second bellows 3a, 3b is enhanced, and the first, second bellows 3a, 3b is prevented from deviating and coming off from the bush 2. On the second bellows 3b to be arranged on the engine room 18 side, there is formed a stepped portion 15 which is caught by a flange 14 formed on the bush 2. Therefore, the fixed portion 32a, 32b of the first, second bellows 3a, 3b is sandwiched and fixed between the fixing member 5 and the flange 14; the fixing member 5 prevents the main body 30 of dust seal from coming off toward the vehicle compartment 17 side; and the flange 14 prevents the main body 30 of dust seal from coming off toward the engine room 18 side. — —

— — **[0075]** The main body 30 of dust seal for closing a clearance (column hole) between the bush 2 and the [[panel]] hole cover 23 is fixed to the bush 2 only with its tightening force because an annular end portion inside each the first, second bellows 3a, 3b, that is, a fixed portion 32a, 32b is fitted in the bush 2, and is more reliably fixed by further tightening from the surroundings by the fixing member 5. Thus, the dust cover 1 for a steering shaft according to the present embodiment uses the fixing member 5 for tightening the fixed portion 32a, 32b of the end portion of a plurality of bellows 3 on the inner periphery side to thereby press and fix the bush 2. In this case, the fixed portion 32a,

32b of the bellows 3 at the inner periphery end is sandwiched between the bush 2 and the fixing member 5 and restrained to the bush 2. Since a tightening force which the fixing member 5 gives to the fixed portion 32a, 32b at each inner periphery end is received by the bush 2, smooth rotation of the steering shaft 20 is not prevented. In other words, the bellows 3 can be reliably fixed to the bush 2 without deteriorating the sliding properties of the steering shaft 20 to the bush 2. --

-- **[0081]** In this respect, although the above-described embodiment is an example of preferred embodiments according to the present invention, the present invention is not limited thereto, but can be carried out by modifying in various ways without departing from the gist of the invention. Depending on, for example, a requirement for space savings within the vehicle compartment 17 or for the design or the like, there may be provided a dust cover 1 for a steering shaft in which the bush 2 is in advance obliquely arranged with respect to an installation panel [[23]] 19 as shown in FIGS. 6 to 8. In FIGS. 6 to 8, component elements identical to those in the above-described embodiment are designated by the identical reference numerals. In examples shown in FIGS. 6 to 8, the first bellows 3a and the second bellows 3b are formed as a separate member respectively, and are to be integrally combined by fitting in the end portions of the first bellows 3a and the second bellows 3b on their mutual outer periphery side. For example, the outer peripheral end of the first, second bellows 3a, 3b is oblong, and they are fitted in each other with the reinforcement member 6 interposed therebetween. The outer peripheral end of the second bellows 3b has an oblong tubular portion 31a which abuts against the inner peripheral surface of the column hole formed on the panel 19, and the outer peripheral end of the first

bellows 3a has an oblong flange portion 31b which abuts against the peripheral edge of the column hole formed on the panel 19. In the tubular portion 31a of the second bellows 3b, there is fitted a reinforcement member 6, and a collar 6a of the reinforcement member 6 is fitted in the flange portion 31b of the first bellows 3a . Thereby, each outer peripheral end of the first bellows 3a and the second bellows 3b is integrally combined, and these outer peripheral ends which are made integral become an installation portion 31 to be fitted in the panel 19. Thus, a portion for extending on the inner periphery side from each outer peripheral end of the first, second bellows 3a, 3b supports the projected portion 8a, 8b obliquely to the panel 19, whereby the bush 2 is supported obliquely to the panel 19 by the fixed portion 32a, 32b of the first, second bellows 3a, 3b, and the steering shaft 20 is supported by the bush 2 such that it becomes oblique to the panel 19 initially. When a plurality of bellows 3a and 3b are made separate from each other as described above, and when the main body 30 of dust seal is formed using a mold, there is an advantage that pattern draw becomes easier. — —